

217/782-2113

OPERATING PERMIT - PSD APPROVAL

PERMITTEE

Archer Daniels Midland Co.
Attn: Pat Dennis
4666 Faries Parkway
Decatur, Illinois 62526

Application No: 99090052

I.D. No.: 143065AJE

Applicants Designation: NOXOFFSET

Date Received: February 3, 1999

Subject: Natural Gas Turbines #6, #7, and #8

Date Issued:

Expiration Date:

Location: One Edmund Street, Peoria

Permit is hereby granted to the above-designated Permittee to OPERATE emission source(s) and/or air pollution control equipment consisting of three natural gas fired turbines as described in the above referenced application and summarized in Attachment A. This Permit is granted based upon and subject to the findings and conditions that follow:

In conjunction with this permit, approval is given with respect to the Prevention of Significant Deterioration of Air Quality Regulations (PSD) to construct and operate the above referenced project, in that the Illinois Environmental Protection Agency (Illinois EPA) finds that the application fulfills all applicable requirements of 40 CFR 52.21. This approval is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et. seq., the Federal regulations promulgated thereunder at 40 CFR 52.21 for Prevention of Significant Deterioration of Air Quality (PSD), and a Delegation of Authority agreement between the United States Environmental Protection Agency and the Illinois EPA for the administration of the PSD Program. This approval becomes effective in accordance with the provisions of 40 CFR 124.15 and may be appealed in accordance with the provisions of 40 CFR 124.19. This approval is also based upon and subject to the following findings and conditions which follow:

Findings

- 1a. Archer Daniels Midland Co. (ADM) has requested a PSD permit to address CO emissions from 3 existing natural gas fired turbines at their Peoria complex. The turbines are designated #6, #7 and #8, and are part of the power house for the source which also includes Boilers #1, #2, #3, #4 and #5.
- b. ADM previously obtained a PSD permit for these turbines that addressed their NO_x emissions Construction Permit 87100035, issued January 22, 1988).
- c. ADM is requesting this PSD permit to address changes to the operation of the turbines that have increased their CO emissions, including low-load operation and improvements to NO_x emission control.

2. The turbines have the potential to emit major amounts of carbon monoxide (CO).
3. After reviewing the materials submitted by ADM, the Illinois EPA has determined that the turbines will (i) comply with applicable Board emission standards (ii) comply with applicable federal emission standards and (iii) utilize Best Available Control Technology (BACT) on emissions of CO.
4. The air quality analysis submitted by ADM and reviewed by the Illinois EPA shows that the proposed turbine project will not cause violations of the ambient air quality standard for CO. The analysis shows that project will have an insignificant impact on the ambient air quality standards.
5. The Illinois EPA has determined that the proposed project complies with all applicable Illinois Air Pollution Board Regulations and the federal Prevention of Significant Deterioration of Air Quality Regulations (PSD), 40 CFR 52.21.
6. A copy of the application and the Illinois EPA's formal review of the application and a draft of this permit were placed in a location in the vicinity of the project, and the public was given notice and an opportunity to examine this material and to submit comments and to request a public hearing on this matter.

The Illinois EPA is issuing approval to operate the proposed project subject to the following special conditions and consistent with the specifications and data included in the application. Any departure from the conditions of this approval or terms expressed in the application would need to receive prior written authorization by Illinois EPA.

Conditions

1. Standard conditions for issuance of operating permits, attached hereto and incorporated herein by reference, shall apply to this project, unless superseded by the following conditions.
2. List of Emission Units and Pollution Control Equipment

Description	Number	Control
Simple Cycle Gas Turbine	6	Low NO _x Burners and Steam Injection
Simple Cycle Gas Turbine	7	Low NO _x Burners and Steam Injection
Simple Cycle Gas Turbine	8	Low NO _x Burners and Steam Injection

Best Available Control Technology

- 3a. i. Each turbine shall be operated to achieve a CO emission rate that is no more than the following concentrations adjusted to 15% oxygen in the exhaust gas.

Turbines 6 and 7

Turbine Output %	Concentration (ppm @ 15% O ₂)	Equivalent Rate (Lb/Hr) Each
≥ 50 and ≤ 100	275	45.0
≥ 25 and ≤ 50	975	120.0
≤ 25	See Note 1	See Note 1

Turbine #8

Turbine Output %	Concentration (ppm @ 15% O ₂)	Equivalent Rate (Lb/Hr)
≥ 75 and ≤ 100	110	50
≥ 50 and ≤ 75	250	90
≤ 50	See Note 1	See Note 1

Note 1: Operations at these rates only allowed during periods of transition, start-up, shutdown, testing, and for avoidance of a power outage.

- b. i. Turbines 6 and 7 shall not routinely operate at less than 25% load. Turbine 8 shall not routinely operate at less than 50% load.
- ii. The turbines shall not be operated for more than 2,300 turbine-hours per year at loads less than the acceptable ranges as listed above, totaled over the three turbines (equivalent to 72 tons/year).
- iii. These limits may be adjusted in conjunction with lowering of CO emission limits based on results of testing as required by Condition 8.
- c. i. Emissions of NO_x from gas turbines 6 & 7 shall be controlled by steam injection techniques, using at least 0.3 pounds steam per pound of fuel, except when turbine load is below the acceptable load or ice fog is deemed a traffic hazard by the Permittee.
- ii. Emissions of NO_x, attributable to each turbine, shall not exceed 42 ppm, adjusted to 15% oxygen in the exhaust gas, at ISO standard day conditions, or the emission rate achieved by "nozzle method" steam injection at a rate of 0.8 pound steam per pound fuel, whichever is higher, except when ice fog is deemed a traffic hazard by the Permittee.
- 4a. The turbines shall each be equipped, operated, and maintained with low NO_x combustion liners and steam injection.
- b. The turbines shall be maintained and operated with good combustion practice to minimize emissions of CO.

- c. The gas turbines shall be operated in a manner consistent with good air pollution control practice to minimize emissions of NO_x and CO during startup/low load operation, malfunction, and shutdown including the following:
 - i. Operation in accordance with the manufactures written instructions or other written instructions developed by the Permittee; and
 - ii. Review of operating parameters of a gas turbine during startup, malfunction, and breakdown, or shutdown as necessary to make adjustments to reduce or eliminate excess emissions.
- d. Upon malfunction of a turbine that will result in NO_x and/or CO emissions in excess of the limit in Condition 3(a) the Permittee shall as soon as practicable cease excess emissions by repairing the affected turbine or removing it from service.

Conditions 3 and 4 represent the application of the Best Available Control Technology for CO and NO_x as required by Section 165 of the Clean Air Act. The provisions for NO_x reflect the original provisions from Construction Permit 87100035, which have not been revised.

5. The emission of smoke or other particulate matter from a turbine shall not have an opacity greater than 30 percent, pursuant to 35 IAC 212.123(a), except as allowed by 35 IAC 201.149, 212.123(b) or 212.124.
6. The only fuel fired in the turbines shall be natural gas.
- 7a. Emissions of NO_x and CO from the turbines shall not exceed the following limits:

Turbine	Pollutant	(Lb/Hr)	(Tons/Yr)
#6 and #7	NO _x	70	307
#8	NO _x	30	131.4
#6 and #7	CO	240	526
#8	CO	130	394.2

- b. Emissions of PM/PM₁₀, VOM and SO₂ from each turbine shall not exceed the following limits:

Pollutant	(Lb/mmBtu ¹ (LHV))	(Lb/Hr)	(Ton/Yr) (Each)	(Ton/Yr) ³ (Total)
PM/PM ₁₀	0.003	0.69	3.03	9.1
VOM	0.024	5.52	24.2	72.5
SO ₂	0.0006	0.14	0.6	1.8

- 8a. i. Within 180 days of the issue date of this permit the Permittee shall have CO, NO_x and VOM emissions from turbines 6, 7, and 8 measured at its expense by an approved testing service.

- A. NO_x and CO shall be measured at three loads across the operating range of the turbine (25 to 100% load for Turbines 6 and 7; 50 to 100% load for Turbine 8).
- B. VOM shall be measured at high and low-loads.
- ii. Emission measurements shall also be conducted upon written request from the Illinois EPA.
- iii. If the Permittee is unable to test the turbines at the loads as prescribed in 8a(i)&(ii), emissions tests shall be repeated when consistent operation at these load ratings is possible.
- b. The following testing methods and procedures shall be used. Refer to 40 CFR 60, Appendix A for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3
Moisture	USEPA Method 4
Nitrogen Oxides	USEPA Method 7
Carbon Monoxide (CO)	USEPA Method 10
Volatile Organic Material	USEPA Method 25A
- c. The Permittee shall submit a written test plan to the Illinois EPA for review and comment for the initial testing and if a significant change in the procedures for this testing is planned from the procedures followed in the previous test. This plan shall be submitted at least 30 days prior to the actual date of testing and include the following information as a minimum:
 - i. A description of the planned test procedures.
 - ii. The person(s) who will be performing sampling and analysis and their experience with similar tests.
 - iii. The specific conditions under which testing will be performed, including a discussion of why these conditions will be representative of maximum emissions based on the operating limits of this permit.
- d. The Permittee shall notify the Illinois EPA prior to conducting these measurements to enable the Illinois EPA to observe testing. Notification for the expected date of testing shall be submitted a minimum of 30 days prior to the expected date. Notification of the actual date and expected time of testing shall be submitted a minimum of 5 working days prior to the actual date of the test. The Illinois EPA may accept shorter advance notice if it does not interfere with the Illinois EPA's ability to observe testing.

- e. Copies of the Final Report(s) for these tests shall be submitted to the Illinois EPA within 30 days after the test results are compiled and finalized. These reports shall include as a minimum:
 - i. General information, i.e., date of test, names of testing personnel, and names of Illinois EPA observers.
 - ii. A summary of results, e.g. CO emissions, lb/hour and ppm.
 - iii. Detailed description of operating conditions of the turbines, including:
 - A. Process information, e.g. operating rates.
 - B. Control system operating parameters during testing.
 - iv. Data and calculations.
 - v. Conclusions.
- 9. The Permittee shall install, maintain, calibrate and operate continuous monitoring systems to monitor and record the fuel consumption and the ratio of steam to fuel being fired in each turbine. This system shall be accurate to within 5.0%.
- 10a. The Permittee shall maintain a file of the following items:
 - i. The heat content (LHV) of the fuel fired in the turbines (Btu/standard ft³).
- b. The Permittee shall maintain the following daily records for each turbine:
 - i. The quantity of natural gas consumed (standard ft³).
 - ii. Identification of each hour when turbine 8 is operated at less than 50% load and Turbine 6 & 7 are operated at less than 25% load, other than during start up, malfunction, or shutdown as addressed below in Condition 10 (d), including the following information:
 - A. The % load at which the turbine(s) are being operated.
 - B. The total time operated at loads less than 50%.
- c. i. The Permittee shall keep inspection, maintenance, and repair logs with dates and nature of such activities for each turbine, including the burner system as may be related to emissions and emission control.

- ii. The logs for each turbine shall include data on burner settings and any detailed information on inspection of the burner system including values of parameters related to burner performance measured during such inspections.
- d. The Permittee shall maintain the following records for each turbine related to startup, malfunction and breakdown, and shutdown:
 - i. The time and date of startup, malfunction or breakdown and shutdown of a turbine, and confirmation that standard practices were followed.
 - ii. Each incident when operation of a turbine continued during malfunction or breakdown with excess emissions, including the following information:
 - A. Date and duration of malfunction or breakdown.
 - B. A description of the malfunction or breakdown.
 - C. The reason continued operation was necessary, including supporting documentation.
 - D. The corrective actions used to reduce the quantity of emissions and the duration of the incident.
- e. The Permittee shall maintain records on a monthly basis for the operating hours for each turbine.
- f. The Permittee shall keep the following emission records: NO_x and CO (tons/month and tons/yr) and PM and VOM (lb/hour, tons/month and tons/year).
- g. The Permittee shall maintain a permanent record of the output of continuous monitoring systems required pursuant to Condition 9.
- h.
 - i. For each turbine, the Permittee shall maintain such other records as may be necessary to describe operation of the turbine, as related to the conditions of this permit, including:
 - A. Records on the operation of the monitoring system.
 - B. Records of operation, as related to traffic hazard due to ice fog.
 - ii. For each turbine, the Permittee shall maintain separate records which:
 - A. Identify any periods during which the continuous monitoring system was not operational, and a turbine was in operation, with explanation.

- B. Identify any 1-hour period during which the average steam to fuel ratio, as measured by the continuous monitoring system, falls below the steam-to-fuel ratio, average fuel consumption, ambient conditions and gas turbine load.
 - C. For existing turbines, identify any period during which ice fog was deemed to be a traffic hazard, the ambient conditions existing during the periods, the date and time the steam injection system was deactivated, and the date and time the system was reactivated.
- i. These records shall be retained for at least five years at a readily accessible location at the plant and be available for inspection and copying by the Illinois EPA.
- 11. All records required by this permit shall be retained on site for a period of at least five years and shall be made available for inspection and copying by the Illinois EPA upon request.
- 12. If there is an exceedance of the requirements of this permit, the Permittee shall submit a report to the Illinois EPA in Springfield, Illinois within 30 days after the exceedance. The report shall include a description of the exceedance, a copy of relevant records, and a description of the exceedance or violation and efforts to reduce emissions and future occurrences.
- 13a. Any required reports and notifications concerning equipment operation, emissions testing, or a monitoring system shall be sent to the Illinois EPA at the following address unless otherwise indicated:

Illinois Environmental Protection Agency
Division of Air Pollution Control
Compliance Section (#40)
P.O. Box 19276
Springfield, Illinois 62794-9276
Telephone: 217/782-5811 Fax: 217/782-6348
- b. A copy of all reports and notifications, as required above, except the Annual Emission Report required by 35 Ill. Adm. Code 254, shall also be sent to the Illinois EPA at the following address:

Illinois Environmental Protection Agency
Division of Air Pollution Control
5415 North University
Peoria Illinois 61614
Telephone: 309/693-5461
- 14. This Permit for the above referenced project does not relieve the Permittee of the responsibility to comply with all Local, State and Federal Regulations which are part of the applicable Illinois State Implementation Plan, as well as all other applicable Federal, State, and Local requirements.

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If you have any questions concerning this permit please contact Kevin Smith at 217/782-2113.

Donald E. Sutton, P.E.
Manager, Permit Section
Division of Air Pollution Control

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cc: Region 2
USEPA
CASM, Illinois EPA